



# NC SERVICES GROUP LTD.

## ENVIRONMENTAL PROTECTION

### PROGRAM



**NORTHERN CRANE SERVICES**  
"GIVING SAFETY A LIFT"  
A NC SERVICES GROUP COMPANY





# ENVIRONMENTAL PROTECTION PROGRAM

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# HEALTH, SAFETY & ENVIRONMENT

## ENVIRONMENT CODE

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### **REMEMBER!**

- **Identify in advance expected waste types and control strategies**
- **Set up adequate waste management disposal and recycling program at project site**
- **Ensure a proper spill management and response program**
- **Identify energy conservation opportunities**
- **Manage water issues related to Storm water, hydro test and dewatering.**
- **Identify and manage Air quality and Noise issues**
- **Identify any required soil management issues**
- **Ensure a WHMIS/ Controlled products management plan**
- **Ensure regulatory compliance and proper documentation**
- **If you are unsure – ASK YOUR SUPERVISOR!**

### **1.0 PURPOSE**

NC Services Group and its affiliated companies (NCSG) have developed an Environmental Code to identify the proper level of protection that will assist employees and contractors in performing their tasks effectively and efficiently on project work sites.

### **2.0 SCOPE AND APPLICATION**

The guidelines and recommendations are provided to increase awareness of control measures to be used by NCSG employees and contractors where there may be potential to address such issues as environmental hazard assessments, spill containment and response, waste identification and management via recycling and disposal, environmental incident response, controlled products management.

In conjunction with referenced legislation, clear and concise direction drives the standards which are to be viewed as the minimum requirements identified by NCSG.

This Process applies, without exception, to all NCSG companies and subcontractors.

### **3.0 DEFINITIONS**

The following definitions are specific to the Environment Code. This list is not to be considered exclusive and additional definitions may be required for specific application as outlined in company standard operating procedures.

#### **3.1 Air Quality**

The composition of air with respect to quantities of contaminants and is routinely compared with acceptable levels of maximum exposure.



#### **3.2 Dewatering**

The removal of water from solid material or soil.

#### **3.3 Documentation**

Records that are maintained and available for review. These include:

- Waste Records including manifests and recycle dockets
- Water Quality and Volume Records
- Soil Assessment and Handling Records
- Product Approval Applications
- Environmental Focus Inspection Reports
- Environmental Action Items List

#### **3.4 Energy Conservation**

The practice of decreasing the quantity of energy used. This may be achieved through efficient energy use, in which case energy use is decreased while achieving a similar outcome, or by reduced consumption of energy services.

#### **3.5 Hydro Test Water**

Water used in the pressure test of piping, pressure vessels, or pressure-containing parts; performed by pressurizing the internal volume with water at a pressure determined by the applicable code or to test the integrity of a process system.

#### **3.6 Noise**

Unwanted sound.

#### **3.7 Regulatory Compliance**

Systems or departments at corporations and public agencies to ensure that personnel are aware of and take steps to comply with relevant laws and regulations.

#### **3.8 Soil Management**

Operations, practices and treatments used to protect soil from contamination.

#### **3.9 Spill prevention and Control**

A plan that outlines how to prevent chemical spills, as well as how it plans to control and contain a spill.

#### **3.10 Storm Water**

A term used to describe water that originates during precipitation events.



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#### **3.11 Waste Management**

The techniques and methods of waste prevention, reduction, recovery and disposal.

#### **3.12 Water Management**

The practices of planning, developing, distribution and optimum utilizing of water resources under defined water polices and regulations

#### **3.13 WHMIS Controlled Products**

Products, materials, and substances that are regulated by WHMIS legislation.

### **4.0 EXPECTATIONS**

The Environment Code will be reviewed at a minimum of every three years.

This code shall supplement, but not supersede any regulatory Provincial / State / Federal legislation within the operational areas of responsibility of NCSG.

Legislative changes shall be monitored by HS&E as per the Legislative Tracking and Updating Process.

Health, Safety and Environment documents will be made available to all personnel.

### **5.0 ROLES AND RESPONSIBILITIES**

#### **5.1 Employees**

It is the employee's responsibility to:

- Ensure a safe and hazard free work site is maintained throughout the entire shift.
- Abide by the Environment code requirements.
- If a hazardous condition is identified, all employees have a responsibility to correct the condition or have it identified to a person responsible to correct the condition.
- Be responsive, through adequate training and understanding, to minimize the risk of loss, damage of injury through keeping the work site safe, clean and free from materials or equipment that could cause workers to slip, trip, or come into unplanned contact with a body resulting in an undesired exposure.



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#### 5.2 Workers

In addition to 5.1, it is the worker's responsibility to:

- Immediately inform the Supervisor of any violations or infractions of this code, which did or could result in an incident or injury to the worker, employees, contractors, or general public within the area.

#### 5.3 Supervisors

In addition to 5.1, it is the supervisor's responsibility to:

- Ensure that workers understand and comply with the Environment code as specified in this code in accordance with the training and instruction received.
- Immediately correct any violations or infractions of this code which have been brought to the attention of the supervisor, which did or could result in an incident or injury to the worker, employees, contractors, or general public within the area.
- Provide in accordance with NCSG programs any corrective action or discipline required to ensure compliance with this code and document said action appropriately.

#### 5.4 Management

In addition to 5.1, it is the management responsibility to:

- Ensure compliance with this code, by all levels of the company including contractors, visitors and the general public within NCSG areas of operation or active worksites.
- Adequate training and monitoring for compliance is established through the use of the HS&E Advisors.

#### 5.5 HSE Advisors

It is the responsibility of HSE Advisors to:

- Take inventory of each delivery of waste to the approved hazardous waste storage area.
- Maintain documentation related to this code.

#### 5.6 Regional Team Lead – HS&E

It is the Regional Team Lead – HS&E responsibility to:

- Develop and review as outlined in Health, Safety and Environment program this code to ensure current compliance with all regulatory legislation and company practices.
- Amend and maintain this code within the defined review period.



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#### 6.0 METHOD

##### 6.1 Waste Management

Recycling or disposal of project waste streams shall be via the client's onsite approved management system and or offsite approved location as per Provincial / State / Federal guidelines. Exceptions or more specific disposal or recycling locations for waste materials are defined in Appendix A.

Hazardous waste generated by NCSG and NCSG subcontractors activities shall be stored in the existing client hazardous waste storage area and or a proper temporary approved waste storage location. The hazardous waste shall be labeled, handled and stored.

Non-hazardous waste shall be collected and disposed as per standard methods. Segregation of the waste into the appropriate containers shall be the responsibility of NCSG and subcontractor line supervision. The non-hazardous waste containers will be labeled with the waste they are to contain.

NCSG and subcontractors shall dispose of their non-hazardous waste into the designated project waste containers on site. Subcontractors shall notify the applicable Superintendent of planned work that will involve large volumes of non-hazardous waste. The Superintendent will then arrange for additional non-hazardous waste bins for the work activity. All subcontractors must provide a detailed waste management identification plan for their hazardous waste management prior to mobilizing to site. The plan must include the subcontractor's hazardous waste generator identification number issued by Environment Agency if applicable. The proposed recycling facility or final disposal location shall be identified with all hazardous waste streams that will be generated by the subcontractor. An estimated monthly waste volume for each waste type shall also be included in the plan.

The Regional Team Lead - HSE shall review the plan to ensure all proposed recycling or disposal facilities are acceptable to NCSG and the client. NCSG and subcontractors shall be advised of any waste management facilities not acceptable for disposal or recycling of project wastes.

All contractors shall be responsible to update the waste management plan for any new wastes generated during project construction activities. Offsite disposal of any hazardous waste not identified in the subcontractor plan is not permitted.

Storage of hazardous wastes must be in accordance with the applicable Environment Hazardous Waste Storage Guidelines, and or Provincial / State / Federal guidelines as applicable.

Regular compliance audits will be completed by the HSE department to verify compliance to site waste management processes/practices.

#### **6.1.1 Waste Collection and Handling**

The key issue related to hazardous waste generated is the handling of the material on site. The waste must be handled correctly to minimize the health and safety risks to those involved. The following outlines the standard procedures for handling generated hazardous waste:

- Line supervision shall identify, during the task review, toolbox talk and FLRA, any hazardous or potentially hazardous wastes that may be generated during the task.
- Line supervision and workers shall review the MSDS for product or products that make up the hazardous waste to identify hazards associated with handling and storing the product(s).
- The crew foreman shall obtain storage containers for the waste. Designated 205 L (45 gallon) steel drums or bulk bags can be made available from several waste management suppliers for the purpose of storing hazardous waste. Contact NCSG HSE Advisor in order to make arrangements.
- Workers shall place the waste into storage containers as soon as possible after the waste is generated.
- The crews responsible for generating the waste must apply a project specific label and a WHMIS worksite label to the outside of the drum. Ensure the label is completed to identify the name of the waste, the Area or Unit where the waste was generated and the date that the waste was generated or contained. The Transportation of Dangerous Goods information shall be filled out if this information is available from the product MSDS.
- The WHMIS worksite label shall identify the name of the product (or waste) and the appropriate safety icons applicable to the waste (refer to MSDS) shall be highlighted.
- A copy of the MSDS for the product or products that make up the waste shall be made in preparation of transferring the waste out of the work area. The waste will not be transferred out of the work area without the proper MSDS included (unless there is no MSDS applicable to the waste).
- The foreman shall contact the HSE dept to ensure all waste handling and or disposals are inventoried and performed as per local regulations.
- The Area Manager or Supervisor will notify the HS&E Advisor of any proposed waste transfer to the client hazardous waste storage area so that proper notification may be given to the client.
- The person requesting the waste removal shall complete the 'Waste Removal Log', attached to this procedure. This form must be completed prior to pick-up and attached to the MSDS (if available).
- A copy of the Waste Removal Log must be provided to the HS&E Advisor for waste tracking purposes.





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#### 6.2 Spill Prevention and Containment

All reasonable means shall be used to prevent spills or leaks. However, accidental spills may still occur on the construction site as a result of a number of activities including:

- The transfer of fuel from tank trucks to storage tanks or construction vehicles/equipment.
- Collection and transport of sanitary sewage by vacuum truck.
- Use of hazardous liquid products, including concrete additives, hydraulic fluids, solvents and lubricating oils.
- Release of operating fluids from construction equipment.

Every worker associated with construction activities, shall be responsible for taking action as required to prevent or mitigate spills and accidents.

##### 6.2.1 Prevention

All reasonable means shall be taken to prevent spills or leaks.

Line supervision shall include appropriate spill containment and protective measures for activities that have the potential to release foreign substances into either the clean storm sewer system or the potentially contaminated water sewer.

This shall include temporary sealing of catch basins or manholes or provision of absorbents booms or socks to prevent spilled material from impacting the sewer systems. Under no condition shall oil or contaminants be discharged into drainage ditches or site sewer systems.

Drip pans shall be used under portable equipment where there is potential for leaks or spills during fueling operations. Drip pans shall be suitably sized for the equipment, constructed of impermeable material and not be allowed to overflow.

Drip pans containing rain water or water from snow melt may be emptied to the ground surface only after visual inspection confirms there is no presence of hydrocarbons, i.e. oily sheen on the water surface.

Other spill prevention measures include:

- Leaking drums, hoses or equipment will be repaired or removed from the work area to prevent spills of hydrocarbons, chemicals or other materials.
- Oily equipment or materials shall not be stored in or near drainage areas where storm water runoff could become contaminated.
- Vehicle and equipment maintenance shall be confined to designated areas - fluids will not be discharged or spilled to land or drainage ditches.
- Drip pans shall be used under equipment where there is high use and/or a potential for leaks, including temporary generators and transformers, sampling lines, stop cocks, dispensing areas, etc.

### 6.2.2 Fueling

Fuel release can be a major source of ground or water contamination.

- Whenever possible vehicle fuelling shall occur in designated areas where the potential for contamination is minimized (e.g. on clay areas).
- As project activities progresses, permanent or semi-permanent fuelling areas that are bermed and paved, or impermeably lined areas shall be constructed.
- As equipment such as piling rigs and cranes will remain stationary in use for considerable periods of time, fuelling of this equipment must often occur at the location of use. In such cases, strict fuelling procedures shall be adhered to and appropriate spill containment devices shall be used.

### 6.2.3 Spill Kits

Spill kits complete with soaker pads; oil-absorbing materials and containment booms shall be required of all subcontractors. Absorbent mats, sand, clay or other absorbent materials shall be readily available for deployment to control or contain spilled material. For activities with a potential for a spill of a larger magnitude, vacuum trucks shall be readily available for immediate response to a spill event.

Spill Containment Kits for work activities will be located in designated areas and available by communicating with NCSG site mgmt for use with specific work activities.

### 6.3 Soil Management

A specific action plan for contaminated soil management might be required in relation to uncovering potentially impacted soils and or handling soils contaminated due to equipments spills.

- In certain instances geotechnical programs will be carried out for specific work scopes, in certain instances an environmental soil assessment might be conducted within the specific work areas. The overall purpose will be to characterize the soil quality and determine the soil's end-use prior to the excavation of the soil.
- The Environmental Soil Assessment will include field measurement of hydrocarbon vapor and laboratory analysis of soil samples for specific soil parameters to allow comparison against the CCME Soil Quality Guidelines for an Industrial Land Use.
- Additional boreholes, soil sampling and analytical work will be completed on planned excavation areas that exhibit definite soil contamination in an effort to properly delineate the extent of the contamination.
- Client historical soil assessment information within the proposed areas of development will also be reviewed and utilized to establish an accurate soil map.
- Based on the Environmental Soil Assessment, the soil in the excavation areas will be classified into Re-useable Fill; Contaminated Fill or Unsuitable Fill.
- Any construction debris or rubble encountered during excavation shall be segregated from the soil. Non-contaminated debris shall be disposed in the appropriate non-hazardous waste bin. Consult the HSE advisor for disposal of contaminated debris.

All contaminated debris to be placed in proper containers, labeled and stored in client approved hazardous waste storage area and as per direction/approval of client.

### **6.3.2 Unexpected Contaminated Fill Sampling and Disposal (Spill Response)**

- The Area Manager or Supervisor will notify the HS&E Advisor when a particular contaminated fill stockpile (from same point of origin) is available for sampling. The Area Manager or Supervisor will liaise with the HS&E Advisor to determine when the piles from various points of origin have accumulated to volumes that would constitute an efficient load-out and haul exercise. This must be coordinated with the responsible client representative.
- The HS&E Advisor will confirm the source location of material placed in a stockpile. This shall be supported by a log report accounting for all loads placed in the management area from a specified location.
- The stockpile will be staked/flagged off by the HS&E Advisor to prevent removal of material or further addition of material after sampling. The staked area will be tagged to indicate the point of origin of the material.
- HS&E Advisor will collect 1 composite sample per 100 m<sup>3</sup> of soil in the stockpile. Each composite sample will consist of 5 sub-samples collected randomly within the area represented by the composite sample.
- The composite samples will be submitted to an offsite laboratory for the following parameters: basic salinity; flash point; CCME F1-F4 fractions including BTEX; ICP total metals; Leachable BTEX; and Leachable metals.
- HS&E Advisor will consult with the client representative to determine if additional parameters are required based on any previous known contamination in the source area of the soil.
- The HS&E Advisor will review the analytical results and develop a recommendation for the appropriate disposition of the stockpiled material. The recommendation will be sent to the client representative for approval.
- If the soil is deemed Re-useable Fill, the client representative will identify the appropriate stockpile location and the HS&E Advisor will advise the Area Superintendent of the soil disposition plan
- If the soil is classified Contaminated Fill, the client representative will confirm the destination for the soil (landfill or landfarm) based on the analytical results.
- The client will arrange the necessary documentation for transfer of the Contaminated Fill off site.
- The applicable client Designate will sign off the waste manifests/bills of lading prior to any material leaving the project site.
- The removal of the Contaminated Fill from the site to the designated disposal/treatment location will be by client and or by client subcontracted contractor.

### **6.4 Controlled Products**

NCSG and its subcontractors are required to identify all controlled products anticipated for use within the project prior to site mobilization and provide a list to NCSG HS&E Advisor in order to ensure client approval and proper management.



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#### 6.4.1 Workplace Hazardous Materials Information System (WHMIS)

WHMIS is designed to protect employees and the environment. A current Material Safety Data Sheet (MSDS) must accompany any controlled product brought on site or through the site warehouse. All WHMIS documentation, in particular MSDS, shall be readily available as follows:

LOCATION	MSDS FORMAT
Area in which the controlled material is being used	Hardcopy
Medical/first aid facilities	Electronic/hardcopy
HSE Department	Electronic

NCSG will maintain a site database of controlled products, including MSDS preparation information to ensure the site WHMIS documentation is current.

#### 6.4.2 Subcontractor Documents

Subcontractors shall provide, at the site kick-off meeting, the list of controlled products that will be used during their construction activities. The list shall include controlled products used with their equipment, during maintenance activities and any products that will be permanently installed during their work. The associated MSDS for the identified products shall be provided to the HS&E Advisor prior to the commencement of work. The subcontractor shall be responsible for providing product MSDS at the location of the use of the product.

The HS&E Advisor will conduct spot checks to ensure that these MSDS are readily available.

#### 6.4.3 Controlled Product Approval Process

In many instances A WHMIS-regulated product must be approved prior to use on a client's site. The HS&E Advisor will review all controlled products, including subcontractor products, against the client approved products list if applicable. If the product is not on the client-approved list, the product will be submitted for approval to the client.

The approval process:

- Facilitates the provision of product health and safety risks summarized in plain language.
- Ensures that recommendations for handling and storage are documented.
- Ensures requirements for containment and disposal are established.
- Identifies regulatory reporting limits for spills.

### **6.5 Noise and Energy Management**

High noise construction activities shall be limited to normal work-shift hours. Extended periods of high noise project activities shall be communicated to the Regional Team Lead – HS&E who will notify the client in order to ensure compliance to local by-laws.

#### **6.5.1 Noise Energy and Monitoring**

If you lose your hearing that is a Physiological effect, Pain and nausea sometimes accompany noise exposure.

Proper use of Hearing protection is crucial, ensure the ear plugs are properly inserted, and also ensure the muffs are sealing properly, while working or chewing, your earplugs can work loose, requiring them to be re-inserted from time to time. A properly designed, well fitted and clean ear protection device is no more difficult to wear than a pair of safety glasses.

#### **6.5.2 Determining Noise Levels in the workplace**

If you need to shout into the ear of a person to be understood, it is likely that the noise limit for exposure is being exceeded.

If you have head noises and ringing noises in your ears at the end of the workday, you are most likely being exposed to too much noise.

If normal speech or music sounds muffled to you after leaving work, but sounds fairly clear in the morning upon returning to work, you are being exposed to noise levels that can eventually cause a partial loss of hearing that can be permanent.

#### **6.5.3 Noise monitoring**

Noise surveys are conducted only with a properly calibrated and approved noise survey monitoring equipment and by a properly qualified or trained individual as per provincial regulations.

Noise surveys are performed at different distances in relation to varying types of noise types in order to assess the exposure and ensure current hearing protection measures are adequate. Following the site mandatory hearing protection policy will result in zero hearing loss.

### **6.7 Storm Water Contamination Prevention**

#### **6.7.1 Significant Inventory**

Pollutants that result from clearing, grading, excavation, and building materials and have the potential to be present in storm water runoff are listed below. This table includes information regarding material type, chemical and physical description, and the specific regulated storm water pollutants associated with each material.



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<b>Trade Name Material</b>	<b>Chemical/Physical Description<sup>(1)</sup></b>	<b>Storm Water Pollutants<sup>(1)</sup></b>
Pesticides (insecticides, fungicides, herbicides, rodenticides)	Various colored to colorless liquid, powder, pellets, or grains	Chlorinated hydrocarbons, organophosphates, carbamates, arsenic
Fertilizer	Liquid or solid grains	Nitrogen, phosphorous
Plaster	White granules or powder	Calcium sulphate, calcium carbonate, sulfuric acid
Cleaning solvents	Colorless, blue, or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates
Asphalt	Black solid	Oil, petroleum distillates
Concrete	White solid	Limestone, sand
Glue, adhesives	White or yellow liquid	Polymers, epoxies
Paints	Various colored liquid	Metal oxides, stoddard solvent, talc, calcium carbonate, arsenic
Curing compounds	Creamy white liquid	Naphtha
Wastewater from construction equipment washing	Water	Soil, oil & grease, solids
Wood preservatives	Clear amber or dark brown liquid	Stoddard solvent, petroleum distillates, arsenic, copper, chromium
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes
Kerosene	Pale yellow liquid petroleum hydrocarbon	Coal oil, petroleum distillates
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)
Erosion	Solid Particles	Soil, Sediment



#### 6.7.2 Areas for Potential Contamination

The following are potential source areas of storm water contamination:

- Cleared and graded areas;
- Asphalt loading dock construction and building construction;
- Construction site entrance and asphalt parking area construction;
- Tree removal area; and
- All undisturbed areas.

#### 6.7.3 Storm Water Contamination Controls

- Keep excavation and soil disturbing activities such as grading to a minimum.
- Install silt fence around all clay and topsoil stockpiles.
- Retain existing vegetation when possible.
- Silt fences need to be cleaned, replaced or supplemented when they reach 1/3 capacity (height of fence). These actions must occur within 24 hours of discovery or as soon as field conditions allow access to the site.
- Maintain construction entrances so that sediments are not tracked onto streets. Sweep any sediment tracked onto streets within 24 hours of discovery. This includes construction entrances to individual lots where home building is underway. Sweepers that “fling” material into the air rather picking up material will not be allowed.
- Have materials on-site to contain and cleanup any contaminants leaked onto the ground during construction.
- Cover or store materials (particularly fuels) so that they are not at risk to contaminate the project area during rainfall or storm water flow.
- Water will be used for dust control on this project.
- Good housekeeping measures are to be implemented to eliminate materials, materials packaging and other litter from leaving the project area. This is especially important during home construction.
- Inlet protection will remain in place until 70 percent of the lots are built upon and stabilized. Care will be taken to avoid disturbing protected inlets.
- Grass filter strips will be maintained adjacent to the curb line on all undeveloped lots.
- Care will be taken to avoid disturbing BMPs in place such as silt fence or grass filter strips along curb lines during home construction. A single rocked or gravel construction entrance will be designated and maintained into each lot under construction.
- De-watering of trenches or basins must be done in a manner that does not cause erosion, scour or deposit sediment in curbs, gutters, storm system inlets and temporary or permanent ditches that are directly connected to a “Water of the State”. The discharge must be dispersed over rock riprap, sand bags, plastic sheeting or other accepted energy dissipating measures. Use of a temporary sediment basin is preferred.

### 7.0 TRAINING REQUIREMENTS AND MATERIALS

All workers will be provided environmental education and awareness through the NCSG site orientation program. Subjects covered will include spill prevention, mitigation and containment. Personnel assigned to spill clean-up activities will receive spill response training.

- NCSG orientation
- Understanding for completion of FLRA
- WHMIS Compliance standards for storage of waste products and materials
- Consultation of applicable environmental work procedures

### 8.0 RESOURCES

- Alberta OH&S Code Part 12, Section 185
- Alberta OH&S Code Part 16, Section 216 – 221
- Alberta OH&S Code Part 29, Section 395 – 414
- Alberta OH&S Guidance Part 29
- Alberta Environmental Protection and Enhancement Act AR 192/96
- BC OH&S Code Part 7, Section 7.1 – 7.9
- BC OH&S Code Part 5, Section 5.3 – 5.19
- BC OH&S Guideline Part 5, Section 3.1
- Manitoba OH&S Regulations Part 12, section 12.1 – 12.12
- Manitoba OH&S Regulations Part 35, section 35.1 – 35.25
- Saskatchewan OH&S Regulations Part VIII, Section 109 – 114
- Saskatchewan OH&S Regulations Part XXII, Section 315 - 329

Please direct any questions regarding the Program to the Regional Team Lead - HS&E.

### 9.0 APPENDICIES

- **Appendix A** – Site Specific Waste Management
- **Appendix B** – Monthly/Yearly Waste Summary and Removal Log
- **Appendix C** – Activities for spill to land
- **Appendix D** – Activities for spill to water
- **Appendix E** – Soil management by soil type





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### Appendix A SITE SPECIFIC WASTE MANAGEMENT

<b>WASTE / SOURCE OF WASTE</b>		<b>HANDLING AND DISPOSITION</b>
Contaminated Soil	Soil resulting from spill clean-up	Contain in suitable containers or bulk bags, label and stockpile. Dispose to approved disposal site after consultation with HS&E Advisor.
Aerosol Cans	Spray paints; lubricants; adhesives	Collect in designated containers.
Plastic, Beverage containers, Glass	Lunchrooms, offices ,trailers	Collect in designated recyclable containers. Recycle via local charitable organization.
General Refuse; Office Waste	Lunch room waste; general garbage	Collect in designated non-hazardous waste bins labeled "General Purpose".
Office Paper	Printing; copying; document mgmt	Collect in designated non-hazardous waste bins labeled "Office Paper".
Cardboard	Shipping boxes; packaging, etc.	Collect in designated non-hazardous waste bins labeled "Cardboard".
Scrap Metal	Structural steel; shoring; cladding; insulation jacketing	Collect in designated non-hazardous waste bins labeled "Scrap Metal".
Used Oil Filters	NCSG Equipment Maintenance, Subcontractor etc.	All used oil filters to be drained for 24hrs and placed into certified drums with lid and clamp for offsite disposal.
Used Oil	NCSG Equipment Maintenance, Subcontractor etc.	NCSG temporary used oil tank, certified identified and labeled barrel with bung openings. Ensuring use of drainage funnel for oil filters.
Wood	Shipping crates; formwork; decking; dunnage	Collect in designated non-hazardous waste bins labeled "Wood".



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<b>WASTE / SOURCE OF WASTE</b>		<b>HANDLING AND DISPOSITION</b>
Chemically treated wood	Sign posts, lumber for fencing	<p>These items can be treated with PCP (Pentachlorophenol) CCA, (Chromated, Copper Arsenate) CN (Copper Hapthanate), ACA (Ammoniacal Copper Arsenate),</p> <p>These items are located within the Canadian Pest control, products act, and therefore are not considered hazardous waste, although these items must be disposed of at Class I or Class II Landfill</p> <p>Never attempt to burn for disposal.</p>



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### Appendix B



Subcontractor \_\_\_\_\_ Log No.: \_\_\_\_\_

Project \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Requested By: \_\_\_\_\_ Signature: \_\_\_\_\_

### Monthly / Yearly WASTE SUMMARY AND REMOVAL LOG

DESCRIPTION OF WASTE MATERIAL	PROCESS THAT GENERATED WASTE	QUANTITY GENERATED (L or m <sup>3</sup> )	CONTAINER TYPE	AREA / UNIT	EQUIP. UNIT NO.	CONTAINER NO.	DESTINATION (Codes Below)

Picked Up From:

Received By:

\_\_\_\_\_

Print Name

\_\_\_\_\_

Print Name

\_\_\_\_\_

Signature

\_\_\_\_\_

Signature

NOTES:

Destination Codes: 1. Hazardous Waste Storage, Rx2; 2. Non-Hazardous Waste Bins; 3. Contaminated Soil Stockpile; 4. Client facility; 5. Subcontractor Lay Down; 6. Other: \_\_\_\_\_

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### Appendix C ACTIVITIES FOR SPILL TO LAND

<u>ACTIVITY</u>	<u>RESPONSIBILITY</u>
Take immediate action to stop or reduce the spill and contain it, without endangering the health and safety of the workers or local population (e.g. right tipped or fallen containers, plug holes or leaks, replace stoppers or lids, etc.).	Workers and/or supervisor
Immediately notify supervisor.	Workers
Notify HS&E Advisor	Supervisor
Notify client, and or regulatory authority as per site specific requirements	Regional Team Lead – HS&E
Initiate chain of notification as per site, “Incident Management”.	Supervisor
Take any actions necessary to prevent the spill from contaminating groundwater or offsite surface water (e.g. construct dirt berms) or from becoming airborne (e.g. cover with plastic sheeting).	Supervisor, after consultation with HS&E Advisor and after checking MSDS
Barricade the area until corrective action is completed.	Supervisor
Identify the spilled material.	Supervisor or HS&E Advisor
Remove the spilled material, including any contaminated soil. Remove any free liquid through adsorption, baling, vacuuming, pumping, etc.	Supervisor, after consultation with HS&E Advisor and client
Contain and dispose of the waste as described in the Waste Management Plan.	NCSG or Subcontractor after consultation with HS&E Advisor and client
Within 24 hours, fill out a Loss control report Incident Investigation Report, following the	Supervisor with HS&E Advisor assistance

Notes:

1. Specialized contractors or the client loss management team may be required in the event of a large spill.
2. Clean up of spills and disposal of the waste resulting from a spill due to a Subcontractor’s activities is the responsibility of that Subcontractor.
3. Spills less than one liter require immediate action to stop or reduce the spill and notification to supervision or the HS&E advisor but do not require further investigation.



# HEALTH, SAFETY & ENVIRONMENT

## ENVIRONMENT CODE

### Appendix D ACTIVITIES FOR SPILL TO WATER

<u>ACTIVITY</u>	<u>RESPONSIBILITY</u>
Take immediate action to stop or reduce the spill and contain it, without endangering the health and safety of the workers or local population (e.g. right tipped or fallen containers, plug holes or leaks, replace stoppers or lids, etc.).	Workers and/or supervisor
Immediately notify supervisor.	Workers
Notify HS&E Advisor	Supervisor
Notify client, and or regulatory authority as per site specific requirements	Regional Team Lead - HS&E
Initiate chain of notification as per site, "Incident Management".	Supervisor
Identify the spilled material.	Supervisor or HS&E Advisor
Take actions necessary to prevent further contamination of onsite surface water (e.g. use booms, dikes, berms, skimmers, etc.).	Supervisor, after consultation with HS&E Advisor and client
Take actions necessary to prevent contamination of offsite surface water (e.g. use booms, dikes, berms, skimmers, etc.).	Supervisor in consultation with the with HS&E Advisor and client
Clean up the spill.	Supervisor, after consultation with HS&E Advisor and client
Contain and dispose of waste as described in the Waste Management Plan.	NCSG or Subcontractor after consultation with HS&E Advisor and client
Within 24 hours, fill out a Loss Control Report Incident Investigation Report,	Supervisor with HS&E Advisor assistance

Notes:

1. Client operating plant or site personnel must be notified if the spill impacts existing plant drainage systems.
2. Specialized contractors or the client loss management team may be required in the event of a large spill.
3. Clean up of spills and disposal of the waste resulting from a spill due to a Subcontractor's activities is the responsibility of that Subcontractor.



# HEALTH, SAFETY & ENVIRONMENT

## ENVIRONMENT CODE

### Appendix E

SOIL TYPE	SOIL MANAGEMENT / DISPOSITION
<p><b>Re-useable Fill</b></p>	<ul style="list-style-type: none"> <li>• Stockpiled in on-site area as designated by client</li> <li>• Material excavated and hauled by NCSG or its subcontractor.</li> </ul>
<p><b>Contaminated Fill</b></p>	<ul style="list-style-type: none"> <li>• Client verifies location for soil disposition</li> <li>• Material excavated and hauled directly off site by client contractor</li> <li>• Client is responsible for securing applicable waste tracking documentation prior to removal of material from site</li> </ul>
<p><b>Unexpected Contaminated Fill</b></p>	<ul style="list-style-type: none"> <li>• Segregate piles from each source location</li> <li>• Log and tag piles by point of origin</li> <li>• Contact HS&amp;E Advisor to characterize and arrange disposal of material</li> <li>• Re-useable Fill stockpiled in location designated by client</li> <li>• Contaminated Fill managed as above</li> </ul>
<p><b>Unsuitable Fill</b>            "Unsuitable" in this case means extremely wet "soupy" material.</p>	<ul style="list-style-type: none"> <li>• Ensure fill is not contaminated – confirm by visual inspection for hydrocarbons or detection of hydrocarbon odors</li> <li>• Haul to pre-designated area</li> <li>• Consult HS&amp;E Advisor if visual contamination is observed</li> </ul>



## HEALTH, SAFETY & ENVIRONMENT

### ENVIRONMENTAL POLICY

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NC Services Group and its affiliated companies (NCSG) regards Environmental Protection as a vital component in the conduct of day to day business.

The company policy is to:

- Comply with all applicable environmental laws, regulations and/or standards
- Ensure that hazards to the public and damage to the environment, created by our company activities, are minimized
- Repair and remediate environmental damage created by our company activities
- Provide leadership in the reduction of waste generated by the company and/or industry by continuously becoming involved in researching alternative methods and/or materials
- Hold management and all employees including contractors, accountable for preserving the environment to which we conduct our business activities in.
- We will not tolerate actions or business activities that knowingly cause damage or unreasonable impact to the environment.

All personnel are encouraged to continuously be aware of the impact to their workplace and/or social activities may have on the environment and join the company in a determined effort to create a healthier, safer environment now and for the future.

NC Services Group and its affiliated companies (NCSG) takes all reasonable and practical steps to prevent any damage to the natural environment, with regards for all forms of wildlife and their habitat.

Management and employees support the reduction of hazardous waste through reuse, recovery, recycling or reclamation. This includes removal of refuse/debris on work sites and immediate clean up of all spills regardless of type and quantity.

Activities performed by our employees or contractors for business purposes shall endeavor to meet or exceed applicable Provincial/State/Federal Regulations together with Industry Best Practices.



## HEALTH, SAFETY & ENVIRONMENT

### Environmental Process

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#### 1.0 PURPOSE

Recognizing environmental concerns and potential hazards and taking the necessary steps to control them is an important aspect of our safety program. NC Services Group and its affiliated companies (NCSG) believes it is imperative to implement safeguards that will assist in the protection of the environment. We are committed to the development and implementation of effective waste management. Our purpose is to create an environment as free of waste as possible within our daily operations. We strive to set ourselves as leaders in the reduction, recycling and proper disposal of our waste.

In fulfilling this commitment to protect the environment, management will ensure all waste material is disposed of in compliance with legislative requirements. Management will ensure all employees understand and adhere to the required disposal procedures for all waste materials.

All employees are responsible for adhering to the requirements of waste management and are encouraged to provide further suggestions for the reduction, reuse and recycling of such.

To be successful, this program requires full participation of all management, supervisors and workers. Each individual must act responsibly when disposing of waste products.

Waste poses a real threat to our environment; therefore, ensuring proper measures are in place will assist in the preservation of the environment.

#### 2.0 SCOPE AND APPLICATION

Proper disposal of waste material will assist in the preservation of our environment. While performing our duties, we shall be conscious of the appropriate protection of humans, animals, plant life, air, water and soil. All materials must be stored, handled and disposed of in such a manner that will provide appropriate protection to the environment. Wherever possible, it is encouraged to recycle and utilize recycled products.

Hazardous goods must be handled safely in accordance with government regulations including, but not limited to Occupational Health and Safety, Transportation of Dangerous Goods and WHMIS.

This process applies to all employees who are engaged in NCSG company business, including contractors.

#### 3.0 DEFINITIONS

There are no definitions for this process.

#### 4.0 EXPECTATIONS

NCSG strongly committed to the protection of the environment and insists that all its employees and contractors working on any worksite conduct all work activities in an environmentally friendly way and responsible manner.



#### 5.0 ROLES AND RESPONSIBILITIES

##### 5.1 Management

- Records the time of the report, source of information and details on location, size, type of spill and any other information available on the Loss Control Report (LCR).
- Ensures that the spill is reported to the proper authorities.
- Oversees the cleanup operations until it is satisfactorily completed.
- Together with the Supervisor decides if additional equipment is required to contain and cleanup spills.
- Maintain contact with Supervisor to ensure final inspection and sign-off on spill site.
- Notifies internal company departments.
- Initiates Mutual Aid Agreements if so required.
- Oversees completion and distribution of Loss Control Report (LCR).
- Ensures investigation identifies measures to prevent similar spills.
- Provides cleanup advice to the Supervisor.
- Assists with preparation of press releases.
- Provides advice on storage and disposal options.
- Ensures that there are follow up reports prepared on the spill event, clean up and environmental impacts.
- Liaise with government agencies (as required)
- Notifies and Liaise with Project Client or Owners (as required)

##### 5.2 Supervisor

- Assist in initial and ongoing response efforts.
- Supervise the spill response team.
- With work crew, take initial action to seal off the source and contain spill.
- Decide with Management if mobilization of additional equipment is required.
- Assess whether burning is a viable cleanup measure. Consult with Regulatory Agency.
- Ensure co-ordination of equipment and manpower as needed (company and contractors)
- Ensure expeditious response and clean up of spill site and impacted area.

##### 5.3 Spill Response Team (composed of various personnel)

- Conduct the cleanup of spills under the direction of the Supervisor.
- Deploy booms, sorbent and other equipment and materials as required.
- Take appropriate response measures.
- Continue the cleanup as directed by the Supervisor or until relieved.

##### 5.4 First Responders

- Assess and verify the initial severity of the spill and safety concerns.
- Gather, collect and confirm information on the spill-source, type, size, cause, etc.
- Notify the Site Supervisor.
- Conduct the initial containment and cleanup operations.

### 6.0 METHOD

#### 6.1 WASTE MANAGEMENT

##### 6.1.1 Reduce

Wherever possible materials will be purchased in bulk form. This will minimize additional packaging and unnecessary waste.

##### 6.1.2 Recycle

All employees are encouraged to recycle wherever possible. Labelled containers have been provided for the collection of returnable beverage containers. When the confidentiality of material does not pose an issue, the use of waste paper is encouraged.

##### 6.1.3 Reuse

All empty drums and pallets are to be stored in the designated areas or removed from site. Arrangements will be made with suppliers and waste management companies to have items gathered for reuse.

##### 6.1.4 Vehicle and Equipment

Vehicles and equipment will be inspected for excessive omissions and leaks prior to being put into service. Should any piece of equipment be found to be non-compliant, all necessary repairs will be performed before the equipment is utilized.

##### 6.1.5 Disposal

All materials must be disposed of in the designated, appropriately labelled containers. Do not discard hazardous materials in the garbage dumpster, in drains, in sewers or on the ground. Containers filled with waste material, hazardous and otherwise, will be disposed of by an external source, licensed for the proper disposal of such items.

All spills will be cleaned immediately and the supplies used (i.e. rags) must be disposed of in the appropriate manner.

A successful spill cleanup is one in which no one gets exposed or injured during the clean up.

\*Remember to check the MSDS (Material Safety Data Sheet).

A **Minor Spill** is one in which ALL of the following conditions are met:

- the responsible party is at the scene; and
- the material spilled is known; and
- the material spilled is not highly toxic; and
- the quantity spilled is small; and
- there is no fire hazard present; and
- the spill is completely contained inside the work area; and
- available & appropriate personnel protective equipment is used (i.e., gloves, eye protection and a half-face respirator)

A **Major Spill** is one in which ANY of the following conditions apply:

- the responsible party is unknown (it's an "orphan" spill); or
- the material spilled is unknown; or
- the material spilled is highly toxic; or
- a large (or undetermined) quantity was spilled; or
- a significant fire hazard may be present; or
- the spill is in a common area (e.g., hallway) or other area accessible to the general public; or
- advanced or unavailable personnel protective equipment (i.e. more than gloves, eye protection and a half-face respirator) is required to respond to the spill; or
- a responder is unsure whether the spill should be considered "Minor" or "Major".

#### **6.2 SPILLS**

##### **6.2.1 Chemical Spills**

Consult the Material Safety Data Sheets (MSDS) for the spilled material to determine the health effects and the requirement for PPE. Refer to the Spill Reporting Procedures in section 6.3.

##### **6.2.2 Medical Facilities**

A medical facility is established at every project site.

Emergency response procedures may vary from one jurisdiction to the next. The site manager must ensure that the emergency response procedure is in place prior to the start of the project.

##### **6.2.3 Containment**

All bulk fuel storage areas will include double walled storage tanks or have lined secondary containment dikes surrounding them. These dikes are constructed of either concrete or compacted earth with liners and have at least 110% containment capacity of the largest tank contained within them.

##### **6.2.4 Inspections**

A weekly inspection program is established at each site to inspect all bulk storage tanks and containment dikes.

##### **6.2.5 Weather Conditions**

Weather conditions have a significant impact when determining which environmental controls are required when developing an emergency spill response strategy.

Sub-zero temperatures and a constantly blowing wind make it difficult for employees to control and cleanup a hazardous spill especially on the ice surface.

##### **6.2.6 WHMIS**

All employees are trained in the Workplace Hazardous Material Information System (WHMIS) and understand the hazards associated with the products used in the workplace or transported.

#### 6.2.7 Fuel Spills

The possibility of a fuel spill on project sites will vary depending on a number of factors: human error, mechanical failure, road conditions, weather conditions, etc.

#### 6.2.8 Spill Response

When responding to any spill, the safety of all employees is paramount, therefore the following steps are part of the procedures:

- Identify the spilled material and follow the appropriate procedure.
- Monitor the area for Explosive gases and Oxygen (O<sub>2</sub>) to ensure a safe atmosphere.
- Determine the potential for fire, and eliminate any hazards.
- Ensure that all personnel are equipped with the appropriate Personal Protective Equipment.

#### 6.3 SPILL CLEANUP PROCEDURE

1. Warn personnel in the immediate area. If a volatile, flammable, or highly toxic material is spilled, have everybody extinguish flames (if trained to do so) and turn off spark-generating equipment and evacuate the area immediately.
2. If clothing is contaminated, remove it and use the emergency shower to rinse the affected areas. If contaminates are in your eyes rinse for at least 15 minutes at an eyewash station.
3. If there are medical emergencies contact controller on site for assistance and an ambulance if required. Provide the following information:
  - a. Your name and phone extension.
  - b. Exact location of spill.
  - c. Name of material spilled.
  - d. Quantity of material spilled.
  - e. Information on injuries to personnel.
4. Obtain the required spill supplies, put on appropriate protective equipment.
5. Remove other materials from around the spill area to prevent cross contamination and tripping hazards.
6. Work in teams. One person cleans the spill; the other should remain outside of the contaminated area and hand supplies to person cleaning.
7. If non-toxic, non-volatile, non-flammable material is spilled, start to place absorbent materials at the edge of the spill.
8. Always pour the neutralizer or absorbent starting at the edges and moving toward the center of the spill site.
9. Neutralize any residue on the floor and work surfaces you are unable to pick up with appropriate absorbent.
10. Scoop up all absorbed material. Remember, if no neutralizer was used, the absorbed material is still hazardous.
11. Wash the affected area with an appropriate cleaning solution (soap and water).
12. Report the spill to your Supervisor.
13. Dispose of all cleanup materials as hazardous waste.

#### 6.4 PRODUCT CATEGORIES

The materials in this Emergency Spill Response are generally divided into five categories:

- Flammable Immiscible Liquids
- Soluble Solids/Oxidizers
- Flammable Compressed Gases
- Soluble Liquids
- Toxic Solids

##### 6.4.1 Flammable Immiscible Liquids

These substances are all hydrocarbon-based and will ignite under certain conditions. Gasoline poses the greatest fire and safety hazard and is not recoverable when spilled on water.

##### 6.4.2 Action Plan Steps

1. Confirm that a spill has occurred. It may not be obvious if a spill has occurred - look for:
  - pooled liquid.
  - damage to equipment/tanks.
  - smell of fuel or chemicals and
  - leaks from hatches, valves or other fixtures
2. Assess The Situation. Before initiating response actions, take the time to determine the nature of a spill and to collect some or all of the following facts:
  - potential risk of fire, explosion and environmental damage.
  - extent of injuries to co-workers or the public.
  - source and approximate size of the spill.
  - possible methods to stop the flow of product; and
  - proximity to water.
3. Take Action
  - Eliminate ignition source(s) if safe to do so.
  - Shut off spill source if safe to do so.
  - Attend to any injured persons.
  - Restrict personnel to the spill site using road barriers or marker tape.
  - Warn others in the area of the spill.
  - Use an explosion meter to monitor atmospheric gas concentrations.
  - Report spill to Advance Coating Solutions management.
  - Transport spill response kit to the spill site.
  - Control spreading and minimize impacts.

##### 6.4.3 Spill Containment and Recovery

Special care should be taken to ensure that spilled material does not reach water bodies where recovery is more difficult.

#### 6.4.4 Waste Disposal

- All combustibles are incinerated on a daily basis. This includes food scraps, office garbage etc.
- Non-hazardous solid “inert” waste generated (i.e. Scrap metal, pipe, wood, plastics, liners, Styrofoam) will be disposed of at approved landfills on site.
- All hazardous wastes and waste items that cannot be incinerated are securely packaged and disposed of in designated locations off-site.
- Prior to disposal, the hazardous waste will be properly packaged, labelled, stored and manifested in a Transportation of Dangerous Goods (TDG) approved shipping container.
- The container will have the appropriate hazardous waste labels.
- All Federal, State, Provincial and Territorial regulations will be adhered to.

#### 6.4.5 Used Container Disposal

- To ensure the proper disposal of used containers that have contacted, collected or contained a hazardous or regulated substance (e.g., paint cans, oil cans, acid containers, aerosol cans).
- Containers having contacted, collected or contained an acute hazardous material, corrosive or reactive substance must be triple washed with water prior to disposal.
- Metal containers can be disposed as scrap metal in the approved landfill after being triple washed and crushed.
- Any free liquid in the container must be disposed of properly, and the residual material allowed drying or solidifying.

#### 6.4.6 Used Drum Disposal

During operations, drums will be used for storage of other “used” products (i.e. used glycol, used oil, cleaning of spills etc). These drums will have to be properly labelled and stored prior to acceptable removal and disposal usually off-site at an approved facility.

### 6.5 SPILL RESPONSE

#### 6.5.1 Response Resources

A wide variety of spill control/recovery equipment and material exists for dealing with spills of petroleum products and chemical reagents. Heavy construction equipment is also available for use on demand.

#### 6.5.2 Response Equipment

All equipment is stored in such a manner as to be readily available on short notice.

The Supervisor would immediately respond to a reported spill site by notifying his on-duty equipment operators to move equipment and material necessary to provide control and clean-up measures to the reported spill site.

Emergency spill containment and recovery materials and supplies are available for immediate mobilization at any time.

#### 6.5.3 Planning & Logistics

The feasibility of containing and recovering a spill will largely be determined by its location and the rate of release, spreading, transport and evaporation. These rates should be compared with the total time needed to deploy response equipment in order to evaluate whether or not containment, and/or sorbent and skimming operations can be effectively implemented. The pre-assembly of spill cleanup kits will expedite response and reduce the total deployment time needed, including:

- Equipment and support material mobilization time.
- Personnel Mobilization, transit and assembly at spill site time.
- Actual equipment set-up and deployment time.
- Determine Whether or not a spill has entered a waterway and whether or not access by land or water to control points is possible so that booms, sorbents and skimmers and vacuum trucks can be deployed. Check maps and consult with personnel familiar with the spill area.
- Establish priorities to optimize utilization of personnel and gear needed for all cleanup phases (containment, removal, storage, transfer and disposal) at selected sites.
- Allow additional time for adverse weather, flying or driving conditions.

#### 6.5.4 Monitoring Spills

Monitor spills throughout the response to ensure safety and to direct cleanup efforts:

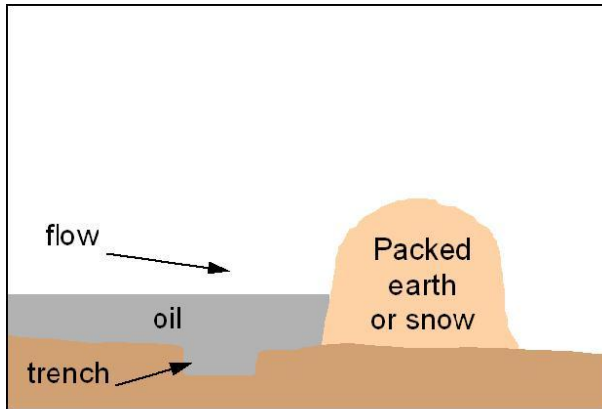
- Explosive gas concentrations in the atmosphere using an explosion meter.
- Spill movement and behaviour, in order to properly direct response efforts.
- All threats to the safety of people, property and the environment.

#### 6.5.5 Spills On Land

Spills on land should be contained as close to the source as possible, if safety allows.

Every effort should be made to ensure that a spill does not reach water, where its containment and recovery are much more difficult and the potential environmental impacts are much greater. Containment can be achieved using:

- A berm or dyke around the spill source
- A trench or ditch down slope of the spill source



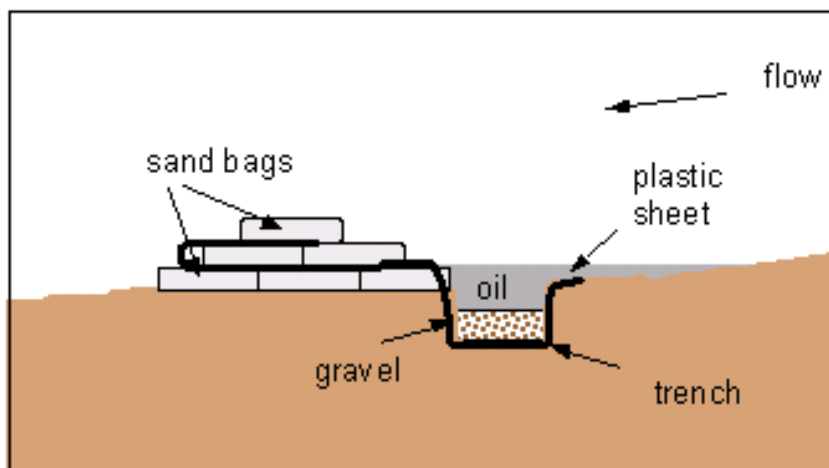
**6.5.5.1 Earth Berm /Trench**

If possible, locate the berm/trench sufficiently down slope of the release point to complete its construction before the spill arrives. Dig the trench along a natural drainage contour.

It should be approximately 0.5 m deep with a relatively flat bottom. The excavated material can then be combined with other available material to build the berm.

**6.5.5.2 Sand Bag Berm/Trench**

Sand bags can be used where available and if the earth is too hard or frozen and cannot be excavated or compacted. A plastic liner can be used to seal the trench and bags should be anchored with gravel or rocks and be woven between layers of bags.





#### 6.5.6 Spills on Muskeg

Muskeg is generally poorly drained, wet and spongy. Internal drainage is usually slow and the depth of peat over mineral soil varies greatly. Muskeg is also highly acidic and low in nutrients, making biodegradation very slow, even during the summer months.

It is recommended that small oil spills in muskeg be mixed with peat moss and allowed to degrade during the summer months since more damage can be done by attempting cleanup using mechanical removal methods.

In the event of a small spill, it is important to weigh the advantages of cleanup versus the potential negative impacts on the terrain. Both personnel and equipment on wet or sensitive areas can cause considerable damage. In many cases, the best solution may be to add nutrients to the contaminated area and monitor the site to ensure that the spill does not migrate to an adjacent sensitive area. In all cases appropriate environmental advisors and Regulatory Authorities should be consulted.

#### 6.5.7 Spills in Water

Containing spills in water is often difficult because oil quickly spreads. In turbulent water, oil and chemicals are likely to mix into the water column, making recovery impractical. For these reasons, it is important that if the spill reaches water, that containment be attempted as close to the source as possible, and that the spill be prevented from reaching a flowing stream.

Spills in lakes should be contained, if possible, before reaching outlets where containment and recovery can be difficult and dangerous.

Efforts to contain spills in large streams should be limited to land based operations where the oil might pool in accessible back eddies. The recovery of water soluble chemicals is not possible.

In flowing streams, oil travels at the same speed as the surface current. On larger rivers or in open lake areas, slicks are also transported at 3.5% of the wind speed. Although a comparatively small effect, it can be an important factor if the wind is at right angles to the water flow and if the water surface is extensive. The wind can force the spill to the sides of the river where flows are slower or the shore of a lake. Long reaches of the river may become contaminated although containment and recovery might also be possible.

In smaller streams, the wind will have less impact and the slick speed can be easily estimated. Placing a small stick in the middle of the stream and determine the length of time required to travel a given distance, (typically 10m). This information can be quickly be converted to speed ( $36/\text{time (sec)} = \text{km/h}$ ) to determine the estimated travel time to a confluence or other sensitive area.

## 6.6 Containment Strategies

Determine the best possible strategy for containment will depend on a number of factors:

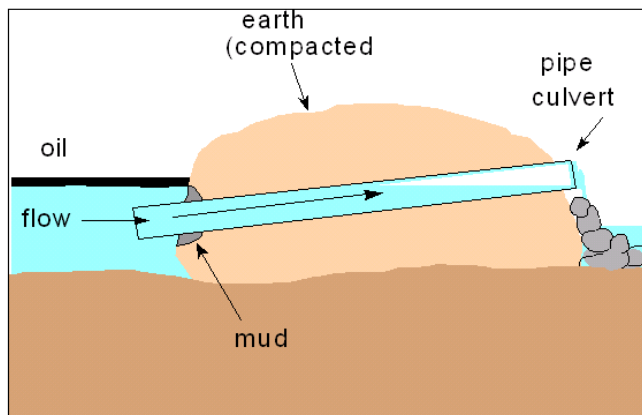
- Speed of slick travel
- Location of possible containment sites
- Availability of personnel and equipment
- Location of sensitive areas
- Safety of operations

Spills on water can be contained by using floating booms (sorbent or non-sorbent) or by constructing a temporary berm or inverted weir. The objective is to build a barrier against which the (normally floating) oil will pool while allowing the underflow of water.

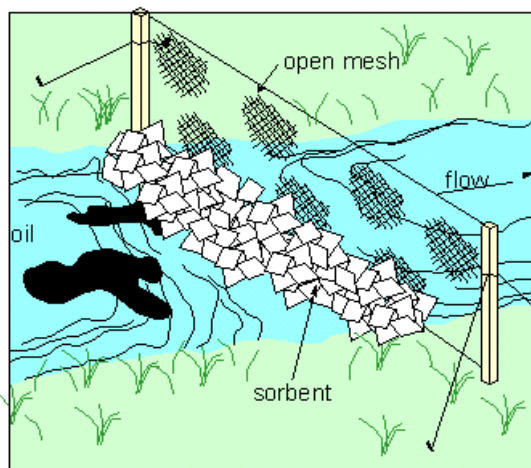
### 6.6.1 Booms

Booming with either sorbent or non-sorbent booms can also be an effective means of containing spills on slow-moving waters and in lakes. Effective containment using conventional booming techniques will be very difficult in streams or rivers where currents exceed 0.7 knots or 0.4m). At these speeds, oil will become entrained in the water flowing under the boom resulting in significant losses. Some improvements can be achieved in waters flowing at 1-2 (0.5-1 m/s) if the boom is deployed at an angle of less than 90 degrees to the direction of the flow.

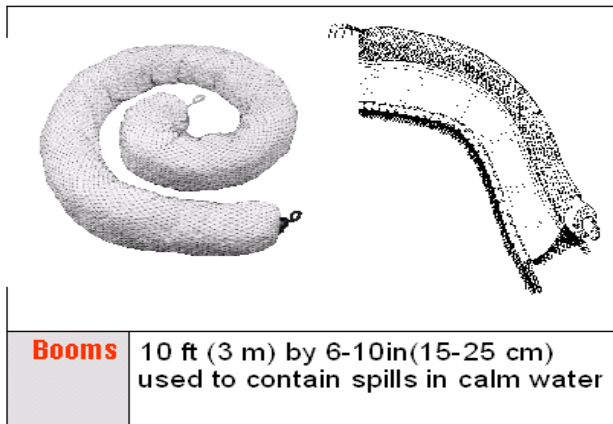
### 6.6.2 Inverted Weir



### 6.6.3 Filter Fence



Sorbent booms or socks can also be used to provide a barrier to floating oil. These types of booms should be checked regularly to ensure that they do not become saturated with either water or oil since they will tend to float very low in the water or even sink and release oil downstream.



**6.6.4 Spills in Ice and Snow**

Oil can remain relatively fresh, in an unweathered state, under snow and ice for several months or more after a spill.

Evaporation rates will still be high when oil is ultimately exposed to the atmosphere except in very low temperatures. Oil can also move up and down small hills (several metres high) due to the capillary action of the snow.

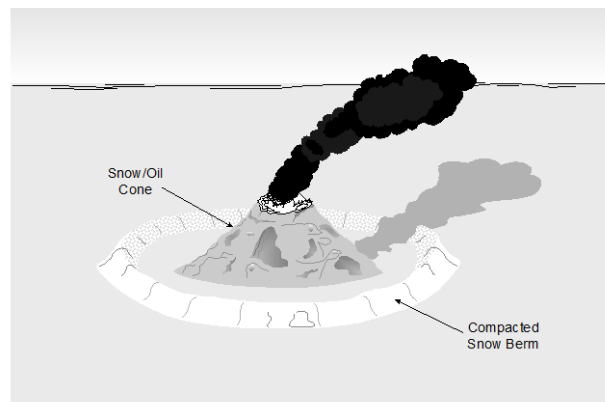
**6.6.4.1 Containment**

Snow and ice can be used to create berms to keep spills from spreading. In frozen rivers angled slots about 1 metre wide or holes can be cut in the ice, where safety permits, to allow possible spill recovery. The oil will rise up into the openings where it will be concentrated, and be available for recovery using skimmers or pumps.

**6.6.4.2 Disposal**

Oil spills in snow and ice can sometimes be burned if the spill can be isolated from the source. Although there is generally a reduced fire hazard, due attention to safety of operations is still required. If burning is not effective, recovered contaminated material will need to be collected and transported to a designated disposal/treatment facility.

**6.6.5 Burning Snow Cone**



### 6.6.7 Recovery

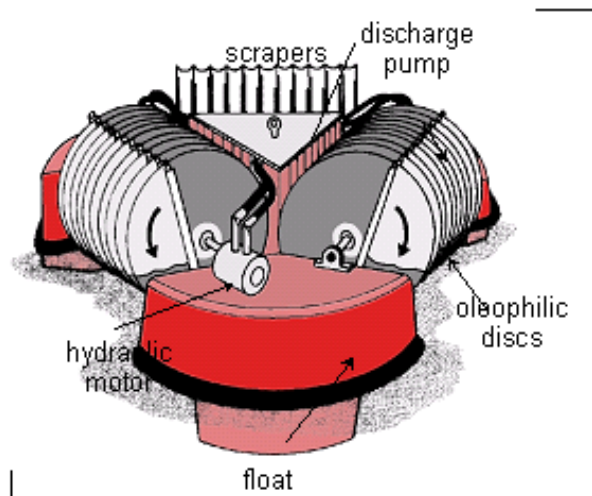
When large volumes of oil have been contained either through natural or mechanical containment, it will be necessary to remove or recover the accumulated oil. This will generally occur in excavated trenches or adjacent to berms or natural barriers and occasionally in slow running streams or quiet ponds.

Vacuum trucks are ideal at cleanup sites accessible by road and where a large volume of oil has pooled that is generally free of water. The truck must be positioned at a safe distance so that there is no possibility of fire or explosion.

Oleophilic devices, such as disc or drum skimmers, can selectively recover oil in water, and are better suited to applications where the oil has formed a distinct layer on top of quiet water. Accumulations adjacent to an inverted weir are an example. A vacuum truck would be largely ineffective in this instance since it would recover large amounts of water, particularly in a thin layer of oil with water flowing through the pipe or culvert.

When using disc or drum skimmers, ensure that small items of debris are periodically removed from the scrapers to ensure their efficient operation.

#### *Disc Skimmer*



### 7.0 TRAINING REQUIREMENTS AND MATERIALS

- Workplace Hazardous Materials Information System Training
- Transportation of Dangerous Goods Training
- Emergency Response Training



## HEALTH, SAFETY & ENVIRONMENT

### Environmental Process

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#### 8.0 RESOURCES

Contact Regional HS&E Advisors for more information regarding this Process.

#### 9.0 APPENDICIES

- **Appendix A** – Risk Assessment and Preventive Measures
- **Appendix B** – Spill Response Actions

**Appendix A**

POTENTIAL PROBLEM	IMPACT	PROBABILITY	PREVENTATIVE MEASURES
Diesel or Oil Major leak from storage tanks	High	Low	Daily inspections and monitoring will take place Remote emergency shutoffs. Maintain additional fuel storage for emergencies.
A spill from a valve left open or a break in a pipe at the transfer facilities or at a pumping station	High	Moderate	Ensure all major valves are locked when not in use. Fuel transfer hoses will have a double locking mechanism. Concrete catchments basin at each station. Markers around all above ground fuel transfer pipelines.
A hydraulic hose breaking on a piece of heavy equipment	Low	High	Mechanics check all hoses and a nozzle for wear and leaks. Operators are required to complete daily equipment checklists for the mechanics; mechanics to service immediately or schedule downtime.
Pump Failure	Low	Low	Pumps are to be inspected weekly and -serviced monthly.
Power Outages	Low	Low	In case of long-term power outages, an emergency power supply

**Environmental Process**

POTENTIAL PROBLEM	IMPACT	PROBABILITY	PREVENTATIVE MEASURES
Chemical Spills	Low – High	Low	Chemicals will be stored in drums, bottles, canisters or packages. Chemicals will be stored in such a way as to protect from the weather Training in the handling of chemicals will take place to ensure safe handling. Regular inspections will take place of stored chemicals. Inventory controls in place. All chemicals used in explosive formulations are stored in designated areas.
Flammables (paints, thinners, acetones, etc.)	Low to High	Low	Stored in fireproof storage facilities. All containers to be labelled.
Devran 201 K	Low to high	Low	Stored in designated site areas.

### Appendix B

#### Hydraulic Oil

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Straw-Yellow Liquid      FLASH POINT: 215°C (Minimum) ODOUR: Petroleum      POUR POINT: -25°C SOLUBILITY: Generally Insoluble      VISCOSITY: Medium (265 x ST, 15°C) VAPOUR DENSITY: Few Vapours Emitted      SPECIFIC GRAVITY: Floats on Water (0.9)	
SAFETY MEASURES	
WARNING	Vapours are heavier than air but are unlikely to form. Toxic gas can form in fire and at high temperatures. CO, CO <sub>2</sub> , and dense smoke are produced upon combustion. Oil mist or vapour from hot oil can cause irritation of the eyes, nose, throat and lungs.
PERSONAL PROTECTION	Always wear impervious, chemical -resistant clothing, gloves, footwear, and goggles; PVC, Nitrile, and Viton are suitable materials (DO NOT USE NATURAL RUBBER). Use of organic vapour cartridge respirator is highly unlikely.
PRECAUTIONS	Avoid excessive heat, which can cause formation of vapours. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO <sub>2</sub> , dry chemical, alcohol foam or water fog. NOTE: water or foam may cause frothing. Use water to cool containers, exposed to fire.



**Lube Oil**

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
<p>APPEARANCE: Amber Liquid    FLASH POINT: 190° to 2220°C          ODOUR: Petroleum    POUR POINT: -35° to -40°C          SOLUBILITY: Generally Insoluble    VISCOSITY: Medium (255 xST, 15°C)          VAPOUR DENSITY: Few Vapours Emitted    SPECIFIC GRAVITY: Floats on Water (0.9)</p>	
SAFETY MEASURES	
WARNING	<p>Vapours are heavier than air but are unlikely to form.          Toxic gas can form in fire and at high temperatures.          CO, CO<sub>2</sub>, and dense smoke are produced upon combustion.          Oil mist or vapour from hot oil can cause irritation of the eyes, nose, throat and lungs.</p>
PERSONAL PROTECTION	<p>Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; PVC, Nitrile, and Viton are suitable materials (DO NOT USE NATURAL RUBBER).          Use of organic vapour cartridge respirator is highly unlikely.</p>
PRECAUTIONS	<p>Avoid excessive heat, which can cause formation of vapours.          Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides.          Eliminate ignition sources.          Restrict access and work upwind of spill.</p>
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	<p>Wear SCBA and eye protection when responding to lube oil fires.          Shut off fuel supply.          Extinguish fire with CO<sub>2</sub>, dry chemical, alcohol foam or water fog.          NOTE: water or foam may cause frothing.          Use water to cool containers, exposed to fire.</p>
On Land	<p>Prevent additional discharge of oil.          Do not flush into ditch/drainage systems.          Block entry into waterways.          Contain spill by diking with earth, snow or other barrier.          Remove minor spills with sorbent and/or peat moss.          Remove large spills with pumps or vacuum equipment.          Spill can also be mechanically removed if oil is too viscous to be pumped.</p>
On Water	<p>Use booms to contain and concentrate spill.          Remove spill using sorbent, skimmer or vacuum truck.          Protection booming can be considered for water intakes.</p>
Storage & Transfer	<p>Store closed, labeled containers in cool, and ventilated areas away from incompatible materials.</p>

## Environmental Process

Disposal	<p>Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during final disposal.</p>
FIRST AID	
EYES	<p>Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.</p>
SKIN	<p>Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.</p>
INHALATION	<p>Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.</p>
INGESTION	<p>DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.</p>

### Waste Oil

ON LAND	<p>Prevent additional discharge of oil. Do not flush into ditch/drainage systems. Block entry into waterways. Contain spill by diking with earth, snow or other barrier. Remove minor spills with sorbent pads and/or peat moss. Remove large spills with pumps or vacuum equipment. Spill can also be mechanically removed if oil is too viscous to be pumped.</p>
ON WATER	<p>Use booms to contain and concentrate spill. Remove spill using sorbent, skimmer or vacuum truck. Protection booming can be considered for water intakes.</p>
STORAGE & TRANSFER	<p>Store closed, labeled containers in cool, ventilated areas away from incompatible materials.</p>
DISPOSAL	<p>Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during final disposal.</p>
FIRST AID	
EYES	<p>Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.</p>

**Environmental Process**

SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

**Gasoline**

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
<p>APPEARANCE: Colorless Liquid (Can Be Dyed) FLASH POINT: -50°C            ODOUR: Gasoline/Petroleum POUR POINT: -60°C            SOLUBILITY: Insoluble VISCOSITY: Not Viscous (&lt;1 cSt)            VAPOUR DENSITY: Will Sink to Ground Level SPECIFIC GRAVITY: Floats on Water            (0.7 - 0.8)</p>	
SAFETY MEASURES	
WARNING	Vapours form instantaneously, and are heavier than air. Empty containers can contain explosive vapours. Vapours can travel to distant sources of ignition and flash back. Eye contact causes irritation. Material can accumulate static charges. Inhalation of vapours can cause irritation of the respiratory tract, headache, vomiting, and unconsciousness.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; PVC, Nitrile, and Viton and PVC are suitable materials (DO NOT USE NATURAL RUBBER or NEOPRENE). Wear full-face organic vapour cartridge respirator where oxygen is adequate; otherwise wear positive pressure SCBA, if circumstances warrant.
PRECAUTIONS	Monitor for explosive atmosphere. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION	Wear SCBA in confined areas.



## HEALTH, SAFETY & ENVIRONMENT

### Environmental Process

ONLY IF SAFETY PERMITS!	Shut off fuel supply. Extinguish fire with CO <sub>2</sub> , dry chemical, alcohol foam or water fog. Use water to cool containers, exposed to fire.
On Land	ELIMINATE IGNITION SOURCES. Do not flush into ditch/drainage systems. Block entry into waterways. Contain spill by diking with earth, snow or other barrier. Remove minor spills with peat moss and/or sorbent pads. Cover pools with foam to prevent vapour evolution if gasoline presents a fire hazard; otherwise allow vapours to dissipate.
On Water	ELIMINATE IGNITION SOURCES. DO NOT ATTEMPT TO CONTAIN OR REMOVE SPILLS. Protection booming can be considered for water intakes.
Storage & Transfer	Store closed, labeled container in cool, ventilated areas away from incompatible materials. Electrically ground containers and vehicles during transfer.
Disposal	Place contaminated materials into segregated marked containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

**Propane**

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
<p>APPEARANCE: Colourless Gas    FLASH POINT: -104°C          ODOUR: Natural Gas Odour    POUR POINT: -190°C          SOLUBILITY: Insoluble    VISCOSITY: N/A          VAPOUR DENSITY: Will Sink to Ground Level    SPECIFIC GRAVITY: Liquid Floats on Water</p>	
SAFETY MEASURES	
WARNING	<p>Vapours form instantaneously, and are heavier than air .          Vapours can travel to distant sources of ignition and flash back.          Eye contact causes irritation.          Material can accumulate static charges.          Inhalation of vapours can cause irritation of the respiratory tract, headache, vomiting, and unconsciousness.</p>
PERSONAL PROTECTION	<p>Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; Nitrile and Viton are suitable protective materials (DO NOT USE NATURAL RUBBER, NEOPRENE, OR PVC).          Avoid frostbite burn to skin and eyes from contact with propane.          Wear full-face organic vapour cartridge respirator where oxygen is adequate, otherwise wear positive pressure SCBA..</p>
PRECAUTIONS	<p>Monitor for explosive atmosphere.          Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides.          Eliminate ignition sources.          Restrict access and work upwind of spill.</p>
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	<p>Wear SCBA in confined areas.          Shut off fuel supply.          Extinguish fire with CO<sub>2</sub>, dry chemical, alcohol foam or water fog.          Use water to cool containers, exposed to fire.</p>
On Land	<p>ELIMINATE IGNITION SOURCES.          DO NOT ATTEMPT TO CONTAIN OR REMOVE SPILLS.</p>
On Water	<p>ELIMINATE IGNITION SOURCES.          DO NOT ATTEMPT TO CONTAIN OR REMOVE SPILLS.</p>
Storage & Transfer	<p>It is not possible to collect released material.</p>
Disposal	<p>Consult with environmental authorities if the disposal of any</p>

**Environmental Process**

	contaminated materials is required.
<b>FIRST AID</b>	
<b>EYES</b>	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
<b>SKIN</b>	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
<b>INHALATION</b>	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
<b>INGESTION</b>	<b>DO NOT INDUCE VOMITING;</b> if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

**Antifreeze (Ethylene Glycol)**

<b>TYPICAL PHYSICAL AND CHEMICAL PROPERTIES</b>	
<b>APPEARANCE:</b> Colourless Liquid <b>ODOUR:</b> Slight; Undetectable <25 ppm <b>SOLUBILITY:</b> Soluble in All Proportions <b>VAPOUR DENSITY:</b> Will Sink to Ground Level	<b>FLASH POINT:</b> 111°C <b>POUR POINT:</b> -13°C (48% Solution) <b>VISCOSITY:</b> Not Viscous (=22 cSt) <b>SPECIFIC GRAVITY:</b> Same as Water (1.0)
<b>SAFETY MEASURES</b>	
<b>WARNING</b>	Vapours are heavier than air. Ingestion of significant quantities can be lethal. Eye contact causes irritation. Skin contact can cause intoxication due to absorption. Inhalation of vapours can cause intoxication, headache, vomiting, unconsciousness with convulsions, and even death Avoid inhaling vapours, particularly in enclosed places.
<b>PERSONAL PROTECTION</b>	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; neoprene, nitrile, PVC are suitable protective materials.

**Environmental Process**

PRECAUTIONS	<p>Monitor empty containers for explosive atmosphere.          Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides.          Eliminate ignition sources.          Restrict access and work upwind of spill.</p>
<b>RESPONSE TO FIRES</b>	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	<p>Wear SCBA in confined areas.          Shut off fuel supply.          Extinguish fire with CO<sub>2</sub>, dry chemical, alcohol foam or water fog. (Note: Water or foam may cause frothing).          Use water spray to cool containers exposed to fire.</p>
On Land	<p>Block entry into waterways.          Do not flush into ditch/drainage systems.          Contain spill by diking with earth, snow or other barrier. Remove minor spills with universal type sorbent.          Remove large spills with pumps or vacuum equipment.</p>
On Water	<p>Ethylene glycol sinks and mixes with water; contain spill by isolating contaminated water through damming or diversion.</p>
Storage & Transfer	<p>Store closed, labelled containers in cool, ventilated areas away from incompatible materials</p>
Disposal	<p>Segregate waste types.          Place contaminated materials into marked containers.          Consult with environmental authorities during final disposal.</p>
<b>FIRST AID</b>	
EYES	<p>Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open.          Remove contact lenses, if exposed to vapours or liquid.          Get prompt medical attention.</p>
SKIN	<p>Remove contaminated clothing.          Wash skin thoroughly soap and water.          Get medical attention.</p>



## HEALTH, SAFETY & ENVIRONMENT

### Environmental Process

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INHALATION	Move victim to fresh air. Perform CPR if victim not breathing Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	INDUCE VOMITING IMMEDIATELY if victim is conscious; Get prompt medical attention.